FISHERIES MANAGEMENT AND EVALUATION PLAN

Lower Columbia River ESU

Steelhead, Trout, Sturgeon and Warmwater Fisheries

Lower Columbia River Mainstem Tributaries

Lower Willamette River Tributaries

Clackamas River and the Sandy River

Prepared by

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Fishery Management and Evaluation Plan

Lower Columbia River Steelhead ESU

Sport Fisheries in Lower Columbia River Tributaries,
Lower Willamette River, including the Clackamas and Sandy Rivers.

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SECTION 1: FISHERIES MANAGEMENT

1.1) General objectives of the FMEP:

The objective of this Fish Management and Evaluation Plan (FMEP) is to conduct fisheries to harvest hatchery- winter steelhead and other fish species in a manner that does not jeopardize the survival and recovery of listed winter steelhead in the Lower Columbia Evolutionarily Significant Unit (ESU**). This FMEP includes all freshwater sport and commercial fisheries which affect or could potentially affect Lower Columbia River ESU winter steelhead in the lower Willamette River and tributaries, including the Clackamas River, the Columbia River tributaries from the mouth of Hood River downstream to the North end of Sauvie Island (near the town of St. Helens), and the Sandy River**. The primary focus is on fisheries targeting unlisted hatchery winter steelhead. This plan also considers the potential of other fisheries to affect this threatened ESU.

1.1.1) List of performance indicators for the management objectives:

Performance indicators include fish population indicators by which we assess the status of populations in the listed ESU within the scope of this FMEP. These population indicators will help determine trends in abundance, risk thresholds, and the impact of management and fishery actions. The primary fish population indicators for listed Lower Columbia winter steelhead consist of counts from Marmot Dam (Sandy River population), North Fork Dam (Clackamas population), North Scappoose Creek (Scappoose Creek population), and estimates derived from harvest card assessments. Counts from Marmot Dam on the Sandy River and North Fork Dam on the Clackamas River will be the primary sources of information with inferences made from this data for the remaining waters in the ESU within

the North Willamette Fish District. Supplemental fish population performance indicators include juvenile abundance indices from collection facilities at North Fork Dam (Clackamas), in-water fish traps in the Clackamas and Sandy River tributaries, and fish presence/absence surveys.

Performance indicators also include creel survey programs that provide catch rate, fishing effort, and catch composition (size, age, mark rates, etc.).

1.1.2) Description of the relationship and consistency of harvest management with artificial propagation programs:

Harvest Management ~

Angling for steelhead in the streams of the Lower Columbia River ESU has historically been very popular. The Sandy River was in the top 10 list of Oregon's most productive steelhead rivers (as measured by harvest card catch) for many years. Historically, both the Sandy and Clackamas rivers were open to steelhead angling throughout the entire year, throughout their entire length. This changed in 1999, with development of adult sanctuary areas and the closure of the upper Sandy River above Marmot Dam and the Upper Clackamas River above North Fork Dam. In addition, winter steelhead angling was closed in Scappoose, Abernethy, Eagle and Hermin creeks after 1998 to protect small wild winter steelhead populations there from adult harvest impacts. **As a result we estimate approximately 75% of the ESU is closed to winter steelhead angling, with these areas set aside as adult sanctuary areas**. Since 1992, wild steelhead release regulations have been in place in steelhead streams throughout the ESU; only adipose fin clipped steelhead have been legal to harvest (Sandy wild fish release regulations went into effect in 1990).

The cumulative effect of these regulation changes was to provide significant new protections to naturally produced steelhead in streams throughout the ESU. Current angling objectives are to provide anglers with harvest opportunities on hatchery fish, greater than would be available from wild production alone, while not jeopardizing the survival and recovery of listed steelhead in the Lower Columbia ESU.

Trout fishing in all streams in the Lower Columbia ESU is restricted to a late May to October 31 season. Trout fishing in these rivers is further restricted to catch and release angling only, with only artificial lures permitted as terminal tackle. These regulations have resulted in significantly reduced angling effort, and provide a high degree of protection to juvenile steelhead.

Chinook and coho salmon are also present in the Sandy and Clackamas rivers and are available for sport harvest in the lower reaches of each river downstream of Marmot and North Fork dams, respectively. Natural bait is allowed for angling in these lower river reaches, however the large sanctuary areas (greater than 80% of the Sandy and Clackamas basins) upstream of Marmot and North Fork dams, where use of bait and salmon angling is closed, provides significant protection to juvenile salmon and steelhead.

Artificial Production Programs~

The Sandy and Clackamas Rivers have had a long history of being stocked with hatchery steelhead. Historically, a variety of out of subbasin, non-locally adapted hatchery steelhead juveniles were released into both subbasins. For example, Oregon's Foster (Skamania) stock is used for in both the Sandy and Clackamas rivers to augment angler harvest opportunities. Additionally, Oregon's Big Creek stock winter steelhead were used for many decades in both rivers, to increase angler catch rates. These steelhead stocks, are genetically dissimilar from the native stocks, and while some genetic interaction between the native and introduced stocks is thought to have occurred, the result of these interactions is unknown.

More recently, significant and wide-reaching changes in artificial propagation programs have been enacted in both subbasins to ensure that stocking of hatchery steelhead is compatible with conserving and recovering listed steelhead. Important direction to guide changes in hatchery fish use is provided by Oregon's Wild Fish Management Policy (OAR 635-007-0525 through 635-007-0529).

Historic winter steelhead hatchery programs have been changed to ones utilizing local wild fish for broodstock. This changeover was initiated with the 1992 brood year on the Clackamas River, and the 2000 brood year on the Sandy River. Broodstock are selected randomly throughout the run timing and are collected without attention to specific phenotypic character. Significant consultation with genetic experts has taken place to ensure that these hatchery programs are consistent with the Department's Wild Fish Management Policy and NMFS Biological Opinions.

Eagle Creek National Fish Hatchery continues to release non-listed early-winter steelhead that are the target of sport fisheries in the Clackamas River and Eagle Creek (tributary to the Clackamas River). This hatchery program is funded by NMFS through the Mitchell Act as mitigation for development in the Columbia River Basin and to provide for sport fisheries. To minimize impacts to listed winter steelhead in the Clackamas River Basin, the hatchery stock is managed to return to Eagle Creek and to complete spawning by March to provide temporal and spatial separation with natural spawning late-winter steelhead.

Releases of non-native Skamania stock summer steelhead continue in both the Sandy and Clackamas river basins to augment angler harvest opportunities. However, smolt releases are restricted to acclimation sites at lower river hatcheries (Clackamas and Sandy hatcheries) and returning adults are not allowed to pass above Marmot and North Fork dams on the Sandy and Clackamas rivers, respectively.

Juveniles from the Sandy and Clackamas winter steelhead programs are reared and released using strategies that are thought to minimize risks to naturally producing steelhead populations. Examples of these strategies include not grading juveniles in the hatchery, acclimating smolts to specific areas in the subbasins, utilizing volitional releases from acclimation.

Returning hatchery winter steelhead adults (fin marked) have not been allowed access into wild steelhead production areas upstream of Marmot Dam on the Sandy River and North Fork Dam on the

Clackamas since 1999. That policy will continue into the future, thereby creating wild fish sanctuary areas in the upper reaches of both rivers. **We estimate that over 80% of the Sandy and Clackamas basins respectively have been set aside as adult steelhead sanctuary areas with no hatchery steelhead or trout influence allowed.**

Finally, stocking of legal-size hatchery rainbow trout into streams of the Lower Columbia River ESU (Clackamas River, 90, 000, and Johnson Creek, 2,000) each year to provide a consumptive angling opportunities was discontinued after 1997 to reduce potential ecological and fishery impacts on wild juvenile steelhead. Hatchery trout releases into tributaries of the upper Sandy River basin were discontinued after 1993 for similar reasons. Trout angling effort in streams, which annually exceeded over 100,000 angler hours has now dramatically declined in subsequent years.

1.1.3) General description of the relationship between the FMEP objectives and Federal tribal trust obligations *further addressed in section 4).*

There are no Federal tribal trust obligations in this FMEP.

1.2) Fishery management area(s):

1.2.1) Description of the geographic boundaries of the management area of this FMEP:

This management plan includes all freshwater fisheries which affect or could potentially affect winter steelhead in the Lower Columbia ESU, including the Columbia River and tributaries on the Oregon side of the river from R.M. 87 (St. Helens) upstream to RM `169.4 (Hood River, sport fishing in Hood River is covered under a separate FMEP), including the Sandy River, and the Willamette River and tributaries from its confluence with the Columbia River upstream to R.M. 26 (Willamette Falls), including the Clackamas River. The Multnomah Channel of the Lower Willamette River is also included. This FMEP addresses both Willamette Basin and lower Columbia fisheries affecting or potentially affecting Lower Columbia River winter steelhead because these fisheries are addressed jointly in management and catch allocation.

Lower Columbia River mainstem sport and commercial fisheries affecting upriver winter steelhead destined for areas upstream from Bonneville Dam are regulated by U.S. v. Oregon management processes involving the states of Oregon, Washington, Idaho, the Federal government, and the Columbia River Treaty Indian tribes. The Section 7 consultation process annually addresses impacts to upriver winter steelhead by Columbia River mainstem sport and commercial fisheries during winter and spring.

1.2.2) Description of the time periods in which fisheries occur within the management area:

Fisheries occur within the management area throughout the period of freshwater residence by adult and juvenile Lower Columbia River winter steelhead. Fisheries targeting adult winter steelhead occur

through seasons on the Columbia, but year-round on the lower mainstem Willamette, Clackamas, and Sandy Rivers (Table 1).

Winter steelhead fisheries: Adult winter steelhead return to streams of the Lower Columbia River ESU from November through May. Native winter steelhead are predominantly a late-returning stock, entering the upper river from mid-February through May. Earlier-returning fish are believed to be heavily influenced by past hatchery releases of Big Creek stock and continuing releases of Eagle Creek stock from Eagle Creek National Fish Hatchery. Juveniles are present in the subbasin year round but only in tributaries during the summer. Smolt emigrations occur in the spring, typically as age-2 fish. Gear restrictions, catch and release only (zero bag limit) for trout and seasonal closures are in effect to protect juvenile steelhead. All steelhead fisheries are managed under wild fish release regulations.

Summer steelhead fisheries: Fisheries for summer steelhead occur in the lower Willamette mainstem, lower Sandy River and the lower Clackamas River. Summer steelhead are not native to these basins, having been introduced into the basin in the late 1960's to provide a sport fishery and to mitigate for lost winter steelhead production. The summer steelhead fishery begins in March and extends through December, but the greatest degree of effort and most of the catch occurs from May through August. Summer steelhead anglers may encounter winter steelhead adults, as both are present during the March through May period. The Columbia River from the mouth to the I-5 Bridge typically does not open to angling for hatchery steelhead until May 16, after the winter steelhead run has passed upstream. Juvenile steelhead are present in the Clackamas and Sandy Rivers during the adult fishery. Gear restrictions, catch and release only (zero bag limit) for trout and seasonal closures are in effect to protect juvenile steelhead. All steelhead fisheries are managed under wild fish release regulations.

Sport spring Chinook fisheries – Willamette Basin: Fisheries for spring Chinook salmon occur in the Multnomah Channel and the lower Willamette River upstream to Willamette Falls. Chinook fisheries are open year round or reopen under permanent regulations on January 1 in most areas and commence as fish enter the area, beginning with the Multnomah Channel and lower Willamette, in February and March. Spring Chinook passage at the Willamette Falls occurs starting in April. The fisheries in the Willamette mainstem, below and above the falls, may incidentally intercept adult winter steelhead during April and May. Juvenile steelhead are present in the Willamette mainstem during the spring Chinook fishery. Gear restrictions and seasonal closures are in effect to protect juveniles. Fisheries for spring Chinook salmon are covered under the Upper Willamette Chinook FMEP approved in February 2001.

Sport spring Chinook fisher – Lower Columbia River: The spring Chinook sport fishery from the Columbia River mouth to the I-5 Bridge is open under permanent regulations from January 1 through March 31. During most recent years, the fishery has closed March 11 to protect upriver spring Chinook that typically begin to show after that date, but the fishery has also been extended into April when impacts on upriver Chinook allow. This fishery may incidentally intercept some winter steelhead. Wild steelhead are prohibited from harvest year round. The states of Washington and Oregon individually set regulations concerning sport fisheries in the mainstem Columbia, however, the regulations are generally identical.

Sport spring Chinook fisheries – Columbia River Select Areas: Small sport fisheries for spring Chinook occur in "Select Areas" of the Lower Columbia River including Youngs Bay, Blind Slough, and Tongue Point. Select areas are off-channel bays and sloughs where terminal fisheries are conducted for hatchery salmon which were reared and released from net pen, primarily to provide commercial fishing opportunities. Select areas are open to sport fishing under permanent regulations for the entire year to maximize opportunity on returns from net pen release programs. Impacts to winter steelhead are expected to be insignificant. The fishery is small, consisting of < 1,000 angler trips per year in the spring. Wild steelhead are prohibited from harvest year round.

Sport shad fisheries: Significant shad fisheries occur in the lower Willamette River from latter May through July. The fishery is concentrated in Multnomah Channel and at Oregon City downstream from Willamette Falls. The shad fishery in the Oregon City area is sampled with a statistical creel survey and angler trips average about 11,000 per year. The Multnomah Channel fishery is comparatively minor. Since the winter steelhead run has into the tributary streams (Clackamas, Abernethy, Tryon, Scappoose, etc.) by May 15, the shad fishery has no impact on adults. Essentially all of the outmigrating smolts have also passed through this area by the time the shad fishery starts up, so there is also little impact to juvenile steelhead.

Resident trout fisheries: Fisheries for resident trout occur in tributaries and standing waters throughout the Lower Columbia River ESU. Impacts on juvenile steelhead are thought to be minimal however, owing to a combination of factors including the following: (1) recent modifications to hatchery trout stocking programs; (2) seasonal closures; (3) catch and release only (zero bag limit) for trout and (4) gear restrictions.

Stocking of hatchery trout for consumptive fisheries is restricted to standing waters and streams outside the ESU to avoid impacts on juvenile steelhead. At present, ODFW stocks North Fork Reservoir and Estacada Lake. These hatchery trout are adipose fin-clipped and the fishery is restricted to marked-only trout. Catch and release regulations and bait prohibitions are in effect for trout angling throughout the ESU to protect juvenile steelhead. Trout season openers in running waters of the ESU have been postponed until late May after smolts have emigrated.

Warmwater fisheries: Significant fisheries occur in the Columbian River mainstem, Multnomah Channel, Willamette River mainstem, and lower sections of the larger tributaries for warmwater game species including largemouth bass, smallmouth bass, channel catfish, crappie, bluegill and walleye. Warmwater fisheries also occur in standing waters throughout the basin. Winter steelhead impacts due to warmwater fisheries are insignificant. In the Columbia River, warmwater fisheries focus on off-channel, near-shore, and deep-water benthic areas where juvenile salmonids are not common. In the Willamette River and its tributaries, warmwater fisheries are concentrated in backwaters and sloughs, which are not hospitable rearing areas for juvenile salmonids. Winter steelhead are not present in most standing waters where warmwater fisheries occur. The fisheries are also most active during warm summer months after winter steelhead smolts have left the system and headed to the ocean. Since warmwater species potentially prey on and compete with juvenile winter steelhead, warmwater fisheries could actually provide some marginal benefit for listed steelhead if the catch were significant.

Sturgeon fisheries Small sturgeon fisheries occur in the mainstem Willamette below Willamette Falls, and in the mainstem Columbia River throughout the ESU. The fishery is open year-round and legal sturgeon retention sizes are 42 to 60 inches. Sturgeon anglers fish with large baits on the river bottom and use very large hooks. Salmon and steelhead impacts in sturgeon fisheries are believed to be insignificant.

Commercial spring Chinook fisheries – Lower Columbia River: Winter commercial salmon fisheries occur from the Columbia River mouth upstream to Kelley Point near the mouth of the Willamette River. These fisheries currently target a small allocation of Willamette spring Chinook and are severely constrained by limitations on impacts to listed upriver spring Chinook stocks. Since 1968, the general management time frame for the winter season has been February 15 to March 10. The gear is restricted to an 8-inch minimum mesh size to avoid incidental handle of winter steelhead. These fisheries are covered under separate mainstem Columbia River section 7 consultations.

Commercial spring Chinook fishery – Select Areas: These terminal fisheries occur with 8" minimum mesh size gill nets during the spring in Youngs Bay, Tongue Point and Blind Slough. Fisheries are for Willamette stock spring Chinook that have been reared and released from a cooperative county, state and industry-supported net-pen research program with a goal of 100% harvest of returning adults. The Youngs Bay program has operated since 1990 with a fishing area that extends from the Highway 101 Bridge upstream to the confluence of the Youngs and Klaskanine Rivers. The fishery traditionally occurred during late-April through mid-June. However, beginning in 1998, a successful experimental, limited, full-fleet fishery began in mid-February through early-March targeting returning age-5 Chinook. The net pen program was expanded in 1995 to include the Tongue Point basin and Blind Slough, where the first fisheries were set in 1998 during late-April to early-June. In 1999, the Tongue Point fishing area was expanded to include South Channel, and the Blind Slough fishing area was expanded to include Knappa Slough from the mouth of Blind Slough to the east end of Minaker Island. Effort in select areas is relatively small with as many as 75 commercial fishers expected to fish at least once, but only 30 expected to participate on a regular basis. Impacts on winter steelhead stocks are minimal. These fisheries are covered under separate mainstem Columbia River section 7 consultations.

Lower Columbia River sport and commercial fisheries impact on naturally produced steelhead of this ESU is estimated to be 2% or less of the populations present. (WDFW and ODFW, 2000).

. Table 1 Significant fisheries occurring within the Lower Columbia Steelhead ESU Management Area.

Fishery	Area	Typical open dates	Peak period	Effect[1]
Sport				
Spring Chinook	Lower Willamette R.	Year-round [3]	Mar – May	B
	Lower Clackamas R.	Year-round [3]	May – Jul	B
	Lower Sandy R.	Feb. 1 – Oct. 31 [3]	Apr. – Jul	B
Winter steelhead	Clackamas R.	Year-round	Nov – March	A
	Sandy R.	Year-round	Nov –March	A
	Eagle Cr.	Nov.-March	Nov.-March	A
	Herman Cr.	Nov-March	Nov-March	A
Summer steelhead	Upper Willamette R.	Apr 1 – Oct 31 [3]	Jun - Aug	B
	Lower Clackamas R.	Year-round [3]	May – Sep	B
	Lower Sandy R.	Year-round	Apr – Oct.	B
	Herman Cr.	Apr-Oct.31	Apr-Oct.31	B
	Eagle Cr	Apr-Oct.31	Apr-Oct.31	B
Sturgeon	Lower Willamette R.	Year-round	Mar - Jun	D
	Mainstem Columbia R.	Year round		
Resident trout	Lower Willamette R.	May 27 – Oct 31	None	C
	Lower Willamette Tribs.	May 27 – Oct 31	June – Aug	C
	Lower Columbia Tribs.	May 27 – Oct 31	June – Aug	C
	Upper Clackamas R.	May 27 – Oct 31	June – Aug	C
	Upper Sandy R.	May 27 – Oct 31	June – Aug	C
	Standing waters	Year-round	Year-round	D[2]
Warmwater species	Willamette mainstem	Year-round	Jun - Aug	D
	Columbia mainstem	Year-round	Jun - Aug	D
	Standing waters	Year-round	May – Sep	D[2]
Coho salmon	Lower Willamette R.	Sep 1 – Oct 31	Sep – Oct	D
	Lower Clackamas R.	Sep 1 – Oct 31	Sep – Oct	D
	Lower Sandy R.	Sep 1 – Oct 31	Sep – Oct	D
	Eagle Creek	Sep 1 – Nov 30	Sep – Nov	D
Commercial / Other				
Lamprey	Willamette Falls	Jun 1 – Aug 31	July	D

[1] A = winter steelhead target fishery, B = potential for incidental encounter of winter steelhead adults, C = potential for incidental encounter of winter steelhead juveniles, D = winter steelhead not encountered.

[2] Wild winter steelhead not present in system with the exception of Foster Reservoir in the South Santiam basin.

[3] Regulations sometimes modified based on year-specific expectations and goals.

1.3) ***Listed salmon and steelhead affected within the Fishery Management Area specified in section 1.2:***

Listed salmon and steelhead present in the Willamette Basin include upper Willamette River spring Chinook, upper Willamette River winter steelhead, and Lower Columbia River steelhead. **This plan considers fishery impacts solely on listed Lower Columbia ESU winter steelhead in the area described in Section 1.2.1.**

Fishery impacts in the Willamette Basin on listed upper Willamette River steelhead and Lower Columbia River Chinook salmon are considered in separate Fish Management and Evaluation Plans prepared by ODFW. The upper Willamette steelhead ESU includes native winter-run populations from Willamette Falls to and including the Calapooia River. Naturally spawning steelhead populations from the Willamette River mouth to Willamette falls including the Clackamas River and Sandy River are included in the Lower Columbia River steelhead ESU. The Hood River is also a part of the Lower Columbia River steelhead ESU and is covered in a separate FMEP written by Oregon Department of Fish and Wildlife.

1.3.1) Description of "critical" and "viable" thresholds for each population (or management unit) consistent with the concepts in the technical document "Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units.":

NMFS defines population performance in terms of abundance, productivity, spatial structure, and diversity and provides guidelines for each (McElhany et al. 2000). NMFS identifies abundance guidelines for critical and viable population thresholds. Critical thresholds are those below which populations are at relatively high risk of extinction. Critical population size guidelines are reached if a population is low enough to be subject to risks from: (1) depensatory processes, (2) genetic effects of inbreeding depression or fixation of deleterious mutations, (3) demographic stochasticity, or (4) uncertainty in status evaluations. If a population meets one critical threshold, it would be considered to be at a critically low level. Viability thresholds are those above which populations have negligible risk of extinction due to local factors. Viable population size guidelines are reached when a population is large enough to: (1) survive normal environmental variation, (2) allow compensatory processes to provide resilience to perturbation, (3) maintain genetic diversity, (4) provide important ecological functions, and (5) not risk effects of uncertainty in status evaluations. A population must meet all viability population guidelines to be considered viable.

Productivity or population growth rate guidelines are reached when a population's productivity is such that: (1) abundance can be maintained above the viable level, (2) viability is independent of hatchery subsidy, (3) viability is maintained even during poor ocean conditions, (4) declines in abundance are not sustained, (5) life history traits are not in flux, and (6) conclusions are independent of uncertainty in parameter estimates. Spatial structure guidelines are reached when: (1) number of habitat patches is stable or increasing, (2) stray rates are stable, (3) marginally suitable habitat patches are preserved, (4) refuge source populations are preserved, and (5) uncertainty is taken into account. Diversity guidelines are reached when: (1) variation in life history, morphological, and genetic traits is maintained, (2)

natural dispersal processes are maintained, (3) ecological variation is maintained, and (4) effects of uncertainty are considered.

This fishery management plan focuses primarily on *abundance* and *productivity*, the key performance features affected most directly by fishery impacts of the scale we propose. Spatial structure is generally a function of habitat size and distribution. The proposed fisheries do not affect habitat. The small fishery impact rates expected would not reduce population sizes to levels at which spatial effects are exacerbated. **Diversity concerns for Lower Columbia River winter steelhead are primarily related to the effects of natural spawning by hatchery fish**. The small proposed fishery impact rates on wild fish are not expected to exert selection pressure on any single characteristic sufficiently to affect diversity

The NMFS provides limited guidance on fish numbers corresponding to critical and viability thresholds. They discuss hypothetical risks related to genetic processes effective at annual spawning population ranging from 50 to several thousand individuals. (McElhany et al. 2000).

The viable threshold for winter steelhead populations in the Lower Columbia River ESU was set at 20% of the full seeding spawner estimate based upon the analysis presented by Chilcote (2001) (Table 2). As stated in this report: "*The logic for selecting 20% of 1/**B** as the threshold was based upon the lack of confidence in predicting the response of populations at escapement levels less than this level. The primary reason for this uncertainty was that escapements below these levels have rarely been observed in the data sets. Averaged across all populations and years, only 6% of the spawner escapement data points were less than 0.20/**B**. Therefore, very little information was available to investigate how these populations actually performed at low escapement levels. In light of these shortcomings, it seemed logical that this threshold of uncertainty would suffice as the viable threshold*."

The method to determine the critical threshold was also based upon the approach described by Chilcote (2001) as follows: "*The critical abundance level for each population were determined using a population viability assessment (PVA) model.* ***"In the context of PVA models, Mace and Lande (1991) proposed the following standard for endangerment: a 20% probability of extinction over a period of 10 generations. For the purposes of this report, their classification of "endangerment" was assumed to be synonymous with "critical". Adopting this standard, the critical abundance threshold was defined as the number of spawners, that if left alone to naturally reproduce for 50 years (approximately 10 generations) would result in the extinction of the population more than 20% of the time. This critical abundance was estimated for each population by seeding each PVA model run with fewer and fewer initial spawners until a 20% extinction probability was achieved."***

1.3.2) Description of the current status of each population (or management unit) relative to its "Viable Salmonid Population thresholds" described above:

In "Conservation Assessment of Steelhead Populations in Oregon", 2001, Chilcote estimates the "viable and critical" thresholds for both the Clackamas and Sandy Rivers, listed in **Table 2**. He

describes both of these populations as "Type 3" populations, in "steady decline with no peak in abundance or evidence of cyclic character…". He continues, "This pattern appears most commonly for steelhead populations in the Upper Willamette and Lower Columbia ESUs." However, his Population Viability Analysis (PVA) results state, "The PVA model results did not place any of the populations in the Snake basin or Lower Columbia ESU in an at-risk category." This result markedly differs from his status review of 1998 wherein he found both systems to be at high-risk. He states," However, in all three cases, changes in the associated hatchery program have been instituted since 1998. It is believed that in the future these changes will prevent hatchery fish from spawning in the natural production areas utilized by wild fish belonging to these populations." This assertion is now the case on both rivers: no hatchery fish are allowed to pass above Marmot Dam on the Sandy River and the North Fork Dam on the Clackamas River.

Table 2. List of the natural fish populations, "Viable Salmonid Population" thresholds, and associated hatchery stocks included in this FMEP.

Natural Populations (or Management Units)	Critical Thresholds	Viable Thresholds	Associated Hatchery Stocks	Hatchery Stock Essential for Recovery
Sandy River Basin	**Abundance:** 82adults/yr	**Abundance:** 336 adults/yr	**Sandy:** Stock 011W	No
Clackamas Basin	**Abundance:** 73 adults/yr	**Abundance:** 279 adults/yr	**Clackamas:** Stock 0122W	No
			Eagle Creek: Stock 030	No

Data gathered from the dams on the Clackamas and Sandy Rivers (Tables 3 and 4) are used inferentially as a representation for the entire ESU occurring within the North Willamette Fish District. Chilcote's assessment (2001) states that these populations are not at risk. He uses a six-year average to describe abundance in both systems as 94% above the viable threshold for the Sandy River, and 42% above the viable threshold for the Clackamas River. The assumption is that these estimates are valid for the rest of the waters in the ESU described in this FMEP.

Chilcote (2001) examined the trend in annual pre-harvest abundance of wild fish for 31 steelhead populations in Oregon and reported the findings as follows: "… for most populations it was possible to look at the pattern of wild fish abundance for the last 20 to 30 years. Nearly all populations had a rapid decline in abundance during the early to mid-1990's and a low point in abundance during the late 1990s. However, beyond this shared characteristic, there appeared to be 3 semi-distinct temporal patterns of steelhead abundance. By far the most common pattern (Type 1) is characterized by a period of low abundance, followed by a period of greater abundance, and then most recently a second, but more severe low period. The Type 2 pattern is similar to the Type 1, however, in the case of the Type 2, the first period of low abundance is deeper than the second low abundance period. A third pattern (Type 3) was also recognized. It is characterized by a steady decline with no peak in

abundance or evidence of cyclic character. This pattern appears most commonly for steelhead populations in the Upper Willamette and Lower Columbia ESUs. This declined appears to have been a feature that started prior to 1990."

In discussions with NMFS during the review of the FMEP, concerns were raised regarding the low abundance levels identified for the critical thresholds for the Sandy River and Clackamas River steelhead populations (Table 2). Because of uncertainty regarding the analysis and the concern that very few data are available when the population abundance is below the proposed viable thresholds, ODFW and NMFS have proposed that the interim critical threshold will be set at the viable threshold abundance levels identified in Table 2. This interim critical threshold will be used until critical thresholds for these populations are developed by the NMFS' Technical Recovery Team. Viable thresholds do not need to be developed for the steelhead populations considered in this FMEP because selective fisheries will remain even it the listed populations reach viable levels.

Table3. Total numbers of hatchery and natural adult salmon and steelhead counted at North Fork Dam (Clackamas River), 1990-1999 (PGE 1999).

	North Fork Adult Fish Counts					
	Spring Chinook		Coho		Steelhead	
Year	Adult	Jack	Adult	Jack	Winter	Summer
1990	3,388	56	725	162	837	4,323
1991	4,584	75	3,123	314	2,107	2,225
1992	3,514	39	3,476	210	1,174	6,001
1993	3,059	31	159	31	1,247	2,181
1994	2,161	13	2,863	54	1,146	1,493
1995	1,639	20	2,037	69	325	1,012
1996	888	15	88	1	531	293
1997	1,264	3	1,435	37	504	1,075
1998	1,395	40	369	15	189	1,484
1999	860	28	241*	61*	3*	788

Jacks not included in adult count.

*=coho counts from Aug-July, winter steelhead counts from Nov-Oct. Therefore, counts not completed. 1990 winter steelhead counts are 1990-91 counts, 1991 counts are 1991-92 counts, and so forth.

Table 4. Total numbers of hatchery and natural adult salmon and steelhead counted at Marmot Dam (Sandy River), 1990-1999 (PGE 1999).

	Marmot Adult Fish Counts					
	Spring Chinook		Coho		Steelhead	
Year	Adult	Jack	Adult	Jack	Winter	Summer
1990	1,557	57	376	80	1,995	4,293
1991	1,888	16	1,491	1	2,916	2,127
1992	4,451	20	790	55	1,636	3,662
1993	3,429	6	193	27	1,567	2,053
1994	2,309	10	601	47	1,680	2,097
1995	1,503	0	697	19	537	1,351
1996	2,561	11	181	0	1,426	1,164
1997	3,304	3	116	0	883	1,966
1998	2,615	1	261	0	928	839
1999	2,042	65	162*	19*	28*	681

Jacks not included in adult count.
*=coho counts from Aug-July, winter steelhead counts from Nov-Oct. Therefore, counts not completed. 1990 winter steelhead counts are 1990-91 counts, 1991 counts are 1991-92 counts, and so forth.

1.4) Harvest Regime:

The primary focus of this FMEP is on fisheries that target hatchery adult winter and summer steelhead where the majority of fishery-related impact occurs. The modification of certain hatchery programs for winter and summer steelhead has significantly reduced, but not eliminated the potential fishery impacts on native winter steelhead adults and juveniles. The Oregon Department of Fish and Wildlife proposes to continue the adult steelhead harvest regime currently in place in the Lower Columbia River ESU. This regime has been structured and implemented over a number of years to provide what we believe to be highly significant protection to both adult and juvenile winter steelhead. **Our long-term intent is to provide consumptive fisheries for hatchery winter and summer steelhead while minimizing fishery-associated mortality on wild winter steelhead**. **We do not anticipate the re-establishment of consumptive fisheries for wild winter steelhead in the foreseeable future**.

An additional component of this FMEP is other sport fisheries (i.e. trout, shad, warmwater, sturgeon), which may incidentally encounter juvenile winter steelhead when smolts are out-migrating. Sturgeon fisheries use large hooks and baits and fish and fish in locations that effectively preclude interception of smolts or rearing steelhead. Trout fisheries in streams are restricted to catch and release, prohibit

the use of bait, and result in a mortality rate on fish released of less than 5%. Overall impacts to the juvenile steelhead resource are believed to be small since anglers encounter but a small fraction of the fish present in a given reach of stream and catch and release-associated mortality is low. Recent modifications to hatchery trout programs have prompted many anglers to focus their efforts on standing waters where listed steelhead are not present.

Current fishing regulations in the Lower Columbia River ESU require *all* unmarked steelhead to be released back to the wild unharmed. There is no retention of unmarked, listed steelhead in the ESU. Only steelhead with an adipose fin clip may be retained in recreational fisheries.

1.4.1) Provide escapement objectives and/or maximum exploitation rates for each population (or management unit) based on its status:

Maximum exploitation rates were developed for each population. However, the term "fishery mortality rate" was used instead of "exploitation rate" to clarify that under current wild fish catch and release regulations only a small fraction of the fish that are caught are actually removed from the spawning population (they die). For example, if 50% of a wild steelhead population is caught in a sport fishery and the post-release mortality rate of these caught fish is 5%, then the fishery mortality rate is 5% of 50% or 2.5%.

Maximum fishery mortality rates for each population were developed based on a PVA analysis described by Chilcote (2001). The assessment entailed performing a series of PVA model runs for a range of different assumed adult mortality rates (AMR) for 27 populations of Oregon steelhead. For each population the probability of extinction (PE) over a 50-year time period was estimated for 16 mortality rates between 0% and 75% (**Table 5**).

This analysis lead to several findings, applicable to nearly all populations. First, for most populations when mortality rates were less than 35%, the probability of extinction was 0.00.

Secondly, once a mortality rate was found that increased the probability of extinction above 0.00, an increment of an additional 20% in mortality rate was usually sufficient to result in a probability of extinction of 1.00. Since the transition from low risk to high risk happens so rapidly once the threshold (or critical) mortality rate is exceeded, management strategies should set a limit on maximum mortality rates at some level considerable less than this trigger point. To do otherwise leaves no room for logic errors in the model used to forecast these impacts, nor does it allow for any error in the actual measurement of mortality rates. Since for most populations the trigger point is a mortality rate of 35% or higher Chilcote (2001) contends that a mortality rate limit of 20% is a reasonable conservation standard for most steelhead populations in Oregon. Therefore, **the 20% maximum fishery mortality rate limit was used for all populations. Chilcote (2001) estimated that under the current catch and release regulations approximately 2% of the annual wild steelhead return to the ESU is anticipated to be lost to hook and release mortality as a result of sport angling (40 % handle rate @ 5% hooking mortality rate).**

Table 5. PVA simulations of estimated probability of extinction in 50 years for Clackamas and Sandy steelhead populations under 16 different hypothetical adult mortality rates.

	Percent Adult Mortality															
Population	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Clackamas	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10	.91
Sandy	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	..20	..72	.1.0

1.4.2) Description of how the fisheries will be managed to conserve the weakest population or management unit:

Sport steelhead angling in the Lower Columbia ESU is currently managed to provide significant protection to the listed wild stocks.

Mandatory wild release regulations for adult steelhead have been in effect throughout the ESU since 1992 (Sandy wild fish release regulations went into effect in 1990) and will continue into the foreseeable future. Additional protection is afforded through the establishment of adult sanctuary areas as described in section 1.1.2.

Significant protection for juvenile steelhead is also being provided under the current harvest management strategy. Natural bait is allowed for angling for salmon and steelhead, however the large sanctuary areas (approximately 75 % of the ESU is closed to adult winter steelhead angling, and closed to the use of bait) provides significant protection to juvenile salmon and steelhead. Additional juvenile steelhead protection is provided by having eliminated legal rainbow stocking and associated angling pressure in all steelhead waters in the ESU. **All trout angling in the ESU is restricted to a late May opener, catch and release, and artificial flies and lures**.

As discussed in section 1.4.1 above, fishing mortality rates on wild steelhead stocks in the ESU will be restricted to 20% or less under this FMEP. It is estimated that under existing catch and release regulations fishing mortality rates do not exceed 5% and are likely considerably lower**. Chilcote (2001) estimated that under the current catch and release regulations approximately 2% of the annual wild steelhead return to the ESU is anticipated to be lost to hook and release mortality as a result of sport angling (40 % handle rate @ 5% hooking mortality rate, See Section 1.4).**

It is assumed that continued implementation of the conservation measures described in this FMEP will *generally* preclude the need to impose additional restrictions on the fisheries. However, in the event

that populations decrease in abundance to levels less than the interim critical thresholds given in Table 2, additional, more conservative measures will be implemented to limit fishery associated mortalities on wild fish will be implemented. **If it expected that any of the Lower Columbia River ESU populations may decline to the interim critical threshold values, then additional time, area and/or fishing gear restrictions would be proposed to further reduce sport hook and release mortality to the affected wild steelhead. If the critical threshold values are reached for any population, total steelhead fishery closure during the period needed to protect the adult and juvenile steelhead winter steelhead would likely be proposed.**

1.4.3) Demonstrate that the harvest regime is consistent with the conservation and recovery of commingled natural-origin populations in areas where artificially propagated fish predominate:

The selective fishery strategy currently in place in the Sandy and Clackamas basins is geared to minimizing impacts wild winter steelhead while maximizing the harvest of hatchery winter and summer steelhead. All hatchery smolts are finclipped, and sport anglers can legally retain only adult hatchery steelhead with a missing adipose fin. Catch and release regulations with no bait allowed for trout angling was implemented for streams throughout the ESU in 1999. **Observations by the Oregon State Police (OSP) indicate angler compliance with wild release regulations is high (in excess of 90%, see Section 3.4)**. It is estimated that the mortality rate associated with existing catch and release fisheries is 5% or less of the fish handled based on data collected by Hooton (1987).

Trapping and recycling programs at North Fork Reservoir (Clackamas River) and the Marmot Dam (Sandy River) fishways were initiated to allow wild fish adults to pass and utilize habitats above the dams while recycling trapped hatchery adults downstream into the fishery. Juvenile steelhead in the trout fishery receive the following protections: marked-only trout releases; catch and release regulations; the delayed trout opener; and the move to no bait/the use of artificial flies and lures only in running waters. ODFW has proactively changed angling regulations, fish culture and fish stocking practices in a major effort to protect wild winter steelhead, and still continue consumptive fisheries on hatchery adults.

1.5) Annual Implementation of the Fisheries:

The Oregon Fish and Wildlife Commission (Commission) adopts angling regulations every year with and extensive public involvement process every four years. This process begins about one year in advance of when specific regulations are actually adopted. Current regulations require release of wild (unmarked) steelhead in the Lower Willamette, Clackamas and Sandy rivers (all other streams in the ESU are closed to steelhead angling) and trout and warmwater fisheries are designed to protect juvenile steelhead. There is no sport fishery planned that would allow retention of wild fish in the ESU.

Numbers of wild steelhead returning to the Lower Columbia River ESU can be estimated by determining the number of wild steelhead passing through fishways at Marmot Dam (Sandy basin), North Fork Dam (Clackamas basin) and Bonnie Falls (Scappoose Creek). This relationship has been described in Section 1.1.1 of this plan. If estimates of wild steelhead counted at these facilities indicate additional conservation measures are necessary, then emergency regulations further restricting fisheries can be implemented. These emergency regulations can be adopted by the Commission within 2 weeks if a Commission meeting is scheduled near the same date. The Commission has also delegated to the Director of ODFW the authority to adopt emergency regulations. If the Director adopts emergency regulations, they can be implemented within a matter of days from the time they are submitted. ODFW will consult with NMFS regarding the proposed regulations changes prior to implementation to ensure that effects on listed LCR steelhead will be consistent with limitations described in this FMEP.

SECTION 2. EFFECTS ON ESA-LISTED SALMONIDS

2.1) Description of the biologically based rationale demonstrating that the fisheries management strategies will not appreciably reduce the likelihood of survival and recovery of the affected ESUs in the wild:

The objective of the proposed harvest regimes in this FMEP is to ensure that sport fisheries covered in this plan are consistent with the recovery of the listed steelhead populations of the Lower Columbia River ESU. The conservative in-river harvest strategies proposed in this FMEP are thought to meet the objective of population recovery. **Because the proposed fishery management strategies result in fishery mortality rates (<2%)** that are substantially less than the 20% maximum fishery mortality rate recommend by Chilcote (2001) for populations of steelhead in Oregon, the proposed fishery should not reduce the likelihood of survival and recovery of the affected populations.

Fishing rates identified in this plan do not appreciably reduce the likelihood of survival and recovery of wild Lower Columbia River steelhead. This assessment is based on estimates of survival and recovery likelihood with a quantitative Population Viability Analysis.

Chilcote (2001) performed a series of PVA model runs for 27 steelhead populations to assess the impact of human-caused fish mortality (e.g. fisheries) on the status and recovery of steelhead in Oregon. These evaluations assessed a range of possible adult mortality rates from 0% to 75%. The results were stated in terms of the probability of the population becoming the extinct after 50 years of each mortality rate, theoretically determining the sensitivity of each to human-caused mortality.

For most populations this modeling exercise suggested that the probability of extinction was essentially zero as long as mortality rates remained less than 30%. However, when mortality rates became greater than 40% the probability extinction increased dramatically. In addition, once the probability of extinction increased beyond 0.05, the transition to an extinction probability of 1.00 was

very rapid. For example, if the probability of extinction was 0.05 under a 40% mortality rate, increasing that rate to 55% would likely be enough for the PVA model to predict 1.00 probability of extinction. These results predict that while most populations can withstand moderate levels of adult mortality with no significant impact on their probability of extinction. However, once mortality rates increase sufficiently to cause the probability of extinction to exceed 0.05, any additional mortality will cause a rapid in the likelihood of extinction.

Because this transition from low risk to high risk happens so rapidly there is little room for error (in either the model or measurement of mortality rates). Therefore, a maximum limit of 20% was used under the conservative assumption that this would provide a reasonable cushion for errors, even though the model results suggested that management under a 40% limit was unlikely to cause. Given these assumptions, the Department advises a mortality limit of 20% for most populations of the steelhead populations in Oregon.

Descriptions of proposed fisheries including conservation actions demonstrating that the fisheries management strategies will not appreciably reduce the likelihood of survival and recovery of steelhead in the Lower Columbia River ESU in the wild are summarized below.

Steelhead Fisheries

Current fishing regulations in the Lower Columbia River ESU require that *all* unmarked adult steelhead be released back to the wild unharmed. There is no retention of unmarked, listed steelhead in the ESU. Only adult steelhead with an adipose fin clip may be retained in recreational fisheries.

The best available scientific information suggests hook and release mortality of adult steelhead is low. Hooton (1987) found catch and release mortality of adult steelhead to be 3.4% (n= 3,715 fish) on average when using a variety of fishing tackle, including barbed and barbless hooks, bait and artificial lures. Hooton concluded that catch and release of adult steelhead was an effective mechanism for maintaining angling opportunity without negatively impacting stock recruitment. Reingold (1975) showed adult steelhead hooked, played to exhaustion, and then released returned to their target spawning stream as well as steelhead not hooked and played to exhaustion.

The overall impact from recreational fishing should be assessed at the population level. Since it is very unlikely that every fish in a population will be caught, overall mortality rates are substantially lower than the estimated mortality rates. For example, if 50% of the steelhead population is caught and released with a 5% catch-and-release mortality rate, the overall impact from fishing to the population would be 2.5%. Information on the rate at which unmarked steelhead are encountered in mainstem lower Willamette and tributary recreational fisheries is limited. The best information suggests that encounter rates are typically less than 10% and most likely in the range of 10-30% (NMFS 1998). These encounter rates would result in an overall impact to a steelhead population of 0.5% to 2.5% from recreational fisheries.

Fishing rates identified in this plan do not appreciably reduce the likelihood of survival and recovery of wild Lower Columbia River ESU winter steelhead. This statement is based on an assessment by Chilcote (2001) of the impacts of human-caused fish mortality (e.g., fisheries) on the status and recovery of steelhead Oregon. This assessment, involving Population Viability Analysis (PVA), is described in section 1.4.1. of this FMEP. In general, these PVA results indicted that for all Lower Columbia steelhead populations examined a maximum fishery mortality rate limit of 20% is sufficient to minimize the biological risk of the fisheries involved.

Trout Fisheries

No retention of trout of any size is allowed in the streams within the geographic boundaries of the listed steelhead ESU. All trout caught must be released unharmed. After 1998, stocking of hatchery trout in waters where listed steelhead reside was terminated. The exceptions are North Fork and Estacada reservoirs where only adipose clipped hatchery trout are stocked. Fisheries in both reservoirs only allow retention of adipose clipped hatchery trout. All unmarked trout must be released unharmed. Late-May openers are in place on steelhead streams to minimize the number of smolts exposed to trout fisheries. These management changes are expected to reduce the mortality of juvenile steelhead while they are rearing in streams. Prior to 1999, bait could be used during the general trout season (end of May through October) throughout the ESU. Since hooking mortality studies (summarized in NMFS 1998) have shown bait to result in significantly higher ($p<0.05$) mortality rates than other gear types, there was concern that using bait could be off-setting the benefits of having a catch and release wild trout fishery. Wydoski (1977) showed the average mortality of trout when using bait to be more than four times greater than the mortality associated with using artificial lures and flies. Taylor and White (1992) showed average mortality of trout to be 31.4% when using bait versus 4.9% and 3.8% for lures and flies, respectively. Schisler and Bergersen (1996) reported average mortality of trout caught on passively fished bait to be higher (32%) than mortality from actively fish bait (21%). Mortality of fish caught on artificial flies was only 3.9%. Therefore, the use of bait when angling for trout during the summer was prohibited after 1998. Anglers are now restricted to artificial flies and lures only when fishing for trout in streams throughout the ESU.

Since the use of bait in adult steelhead and salmon fisheries has *not* been shown to result in higher mortality rates compared to artificial flies and lures (as discussed in Hooton, 1987), bait is still permitted in adult salmon and steelhead fisheries. However, in order to reduce the potential of hooking juvenile steelhead during adult salmon and steelhead fisheries, large sanctuary areas (approximately 75% of the ESU) have been implemented where no steelhead and salmon angling is allowed.

All streams in the ESU do not allow retention of any trout (resident rainbow, cutthroat, or steelhead). In these cases, impacts are post-release mortality associated with catch and release fishing.

Fishing effort for trout throughout the ESU is currently much lower than in previous years because of the elimination of hatchery trout stocking in streams and the conservative, selective fishing regulations. It is likely that only a small percentage of the juvenile steelhead rearing in a watershed would be

caught and released because of the current regulations and sanctuary areas that are closed to all fishing. NMFS assessed the benefits of recent angling regulation changes for steelhead along the Oregon Coast (NMFS 1998). It was concluded that these changes likely resulted in a substantial reduction in harvest mortality of juvenile and adult steelhead. Since many of the regulations are similar in the Lower Columbia and Middle Columbia River, Upper Willamette, and Snake River Basin ESUs, it is expected that overall mortality would be within the range estimated along the Oregon Coast (<1% to 10%). It is difficult to quantify the impacts to juvenile steelhead from sport fishing because of the lack of information and variation in fishing effort among the areas within the ESU. However, given the current regulations that are in place for juvenile steelhead, overall impacts are likely to be quite low. As a result, in the Lower Columbia River ESU we estimate that less than 1% of the juvenile steelhead population will be handled catch and release trout fisheries The aforementioned management changes to trout programs are expected to significantly reduce the mortality of juvenile steelhead.

Warmwater and Nongame Fish Fisheries

Fisheries occur in the mainstem Willamette and lower sections of some lower Willamette River tributaries for warm water game species including largemouth bass, small mouth bass, crappie, bluegill, warmouth, catfish, etc. Nongame fisheries involve carp, northern pikeminnow, largescale sucker, peamouth, and chiselmouth. In the Lower Columbia River tributaries, warm water fisheries are concentrated in backwaters and sloughs, which are generally not hospitable rearing areas for juvenile salmonids. Fisheries are also most active during warm summer months after spring migrant juvenile steelhead have left the system.

Since warm water species potentially prey on and compete with juvenile salmonids, warm water fisheries could actually provide some marginal benefit for steelhead if the warm water catch were significant.

Sturgeon Fisheries

Small sturgeon fisheries occur in the mainstem Willamette below Willamette Falls, and the mainstem Columbia River throughout the ESU. The fishery is open year-round and legal sturgeon retention sizes are 42 to 60 inches. Sturgeon anglers fish with large baits on the river bottom and use very large hooks. Salmon and steelhead impacts in sturgeon fisheries are believed to be insignificant. For the last several years ODFW has deployed baited setlines at strategic locations on the mainstem in order to gather biological information on sturgeon. Though the technique has produced numerous sturgeon and the occasional nongame species, we have yet to encounter a salmonid during sampling.

The current fishery mortality rates for Lower Columbia River ESU steelhead are approximately 2%, considerably less than the 20% limit suggested by Chilcote (2001). Therefore, the continuance of fisheries described in this plan should not adversely impact the conservation and recovery of these populations.

2.1.1) Description of which fisheries affect each population (or management unit):

Upstream migrating adult steelhead are present year round in the FMEP management area. Additionally, the lower reaches of the Sandy and Clackamas rivers, downstream of Marmot and North Fork dams, respectively, are open to steelhead angling year round.

Adult wild winter steelhead from Sandy and Clackamas rivers in the Lower Columbia River ESU are potentially affected by fisheries targeting salmon and steelhead in the mainstem Columbia River and the lower mainstem Willamette River and fisheries in the lower mainstem Sandy and Clackamas rivers. Steelhead from Scappoose Creek and any other small tributaries to the lower Willamette are closed year round to salmon/steelhead angling, and therefore adult steelhead from those streams are potentially affected only by fisheries in the mainstem Willamette.

Juvenile winter steelhead in the Lower Columbia River ESU are subjected only to catch and release trout fisheries, the result of which is overall immeasurably low impact to listed populations. Warmwater and sturgeon fisheries essentially do not encounter juvenile winter steelhead due to the type of terminal tackle used (e.g. large hooks and bait types for sturgeon). Warmwater fish and fisheries do not overlap with juvenile winter steelhead rearing habitat. See detailed descriptions summarized below.

Sport winter steelhead fisheries: Fisheries for winter steelhead occur in the lower Clackamas and Sandy rivers from November through May. Angler harvest is restricted to adipose fin-clipped hatchery steelhead only and occurs primarily in the in the lower reaches of the aforementioned rivers, as well as the lower Willamette River downstream of Willamette Falls. Juvenile steelhead are present in the Willamette mainstem, Sandy and Clackamas rivers during the adult fishery. Gear restrictions, catch and release only (zero bag limit) for trout and seasonal closures are in effect to protect juvenile steelhead.

Sport summer steelhead fisheries: Fisheries for summer steelhead occur in the lower Willamette mainstem, lower Columbia River mainstem, Clackamas and Sandy rivers. Summer steelhead are not native to the Sandy and Clackamas rivers, but were introduced into these streams in the late 1960s to provide a sport fishery and to mitigate for lost winter steelhead production. The summer steelhead fishery begins in March and extends through December, but the greatest degree of effort and most of the catch occurs from May through August. Summer steelhead anglers may encounter winter steelhead adults, as both are present during the March through May period. The Columbia River from the mouth to the I-5 Bridge typically does not open to angling for hatchery steelhead until May 16, after the winter steelhead run has passed upstream. Juvenile steelhead are present in the Willamette mainstem, Molalla, and Santiam during the adult fishery. Gear restrictions, catch and release only (zero bag limit) for trout, and seasonal closures are in effect to protect juvenile steelhead.

Sport shad fisheries: Significant shad fisheries occur in the lower Willamette River from late May through July. The fishery is concentrated in Multnomah Channel and at Oregon City downstream from Willamette Falls. The shad fishery in the Oregon City area is sampled with a statistical creel survey

and angler trips average about 11,000 per year. The Multnomah Channel fishery is comparatively minor. Since the winter steelhead run has passed into tributary streams by May 15, the shad fishery has no impact on adults. Essentially all of the out migrating smolts have also passed through this area by the time the shad fishery starts up, so there is also little impact to juvenile steelhead.

Sport resident trout fisheries: Fisheries for resident trout occur in tributaries and standing waters throughout the Willamette Basin. Impacts on juvenile steelhead are thought to be minimal however, due to a combination of factors including: 1) recent modifications to hatchery trout stocking programs (including adipose clipping all trout released into North Fork and Estacada reservoirs) 2) seasonal closures, 3) catch and release only (zero bag limit) for trout and 4) gear restrictions. Stream stocking of hatchery trout into the Clackamas River and Johnson Creek was discontinued and shifted to standing waters after 1997. Trout stocking into the Sandy River discontinued after 1994. Implementation of these measures throughout the ESU has resulted in a significant decrease in trout angling activity throughout the region.

Stocking of hatchery trout for consumptive fisheries is restricted to standing waters to avoid impacts on juvenile steelhead. Catch and release regulations and bait prohibitions are in effect for trout angling throughout the ESU to protect juvenile steelhead. Trout season openers in running waters of the ESU have been postponed until late May after smolts have emigrated.

Sport warmwater fisheries: Significant fisheries occur in the Columbia River mainstem, Multnomah Channel, Willamette River mainstem, and lower sections of the larger tributaries for warmwater game species including largemouth bass, smallmouth bass, channel catfish, crappie, bluegill, and walleye. Warmwater fisheries also occur in standing waters throughout the basin. Winter steelhead impacts due to warmwater fisheries are insignificant. In the Columbia River, warmwater fisheries focus on off-channel, near-shore, and deep-water benthic areas where juvenile salmonids are not common. In the Willamette River and its tributaries, warmwater fisheries are concentrated in backwaters and sloughs, which are not hospitable rearing areas for juvenile salmonids. Winter steelhead are not present in most standing waters where warmwater fisheries occur. Fisheries are also most active during warm summer months after winter steelhead smolts have left the system and headed to the ocean. Since warmwater species potentially prey on and compete with juvenile winter steelhead, warmwater fisheries could actually provide some marginal benefit for listed steelhead if the catch were significant.

2.1.2) Assessment of how the harvest regime will not likely result in changes to the biological characteristics of the affected ESUs:

Fishing impact rates are small and spread over the breadth of the run so that no subcomponent of the wild stock will be selectively harvested at a rate substantially larger than any other portion of the run. No significant harvest differential will occur for different size, age, or timed portion of the run. In addition, low fishing rates for wild fish will result in increased numbers of wild spawners even in periods of poor freshwater migration and ocean survival conditions. Larger populations will be less subject to genetic risks and loss of diversity associated with small population sizes. Finally, increased

harvest rates of hatchery fish in selective fisheries should benefit wild stock integrity and diversity by removing a greater fraction of the hatchery fish that could potentially stray into wild production areas.

2.1.3) Comparison of harvest impacts in previous years and the harvest impacts anticipated under the harvest regime in this FMEP:

Current impact rates on wild winter steelhead in freshwater fisheries are substantially reduced from historic levels (Table 6). Prior to wild steelhead release regulations being implemented in 1992 throughout the ESU Chilcote 2001 estimated harvest rates on wild steelhead in this ESU to be significant and in the range of 40%. Since catch and release regulations have been in effect, angling related mortality is now estimated in the range of 2%.

Table 6. Estimated Wild Steelhead Fishery Mortality Rates (Chilcote 2001)

Spawning Year	Wild Fish Count (Sandy R.)	Wild Fish Count (Clackamas R.)	Harvest Rate
1990	1743	953	0.40
1991	1086	482	0.40
1992	1572	1430	0.02
1993	981	1150	0.02
1994	905	1169	0.02
1995	927	913	0.02
1996	298	161	0.02
1997	851	291	0.02
1998	589	285	0.02
1999	678	177	0.02
2000	618	447	0.02

Fish Counts are ODFW, 2000. Harvest rates are Chilcote, 2001.

Past harvest impacts to juvenile steelhead as a result of trout fisheries in streams of the Lower Columbia River ESU are unknown. Cramer et al (1997) were of the opinion that the greatest sport harvest of steelhead in recent times may have been on juveniles taken in trout fisheries, rather than on adults. This was likely the case in Sandy and Clackamas rivers considering the regulations and management practices in place for many years.

For example, stocking of catchable trout and the resultant intensive trout fisheries occurred in the Sandy and Clackamas rivers, Scappoose and Johnson creeks for many decades until discontinued in the 1990's. These important winter steelhead spawning and rearing streams likely received significant impacts to natural steelhead production during that time as a result of fishery and ecological effects

from trout stocking and resultant fisheries. After 1998, all trout fishing in the Lower Columbia River ESU has been mandatory catch and release of trout and no bait is allowed.

The more restrictive angling regulations presently in place, combined with no trout stocking in streams likely provides significantly greater protection to juvenile steelhead from angling mortality than occurred historically. In addition, fishing effort for trout throughout the ESU is currently much lower than in previous years because of the elimination of hatchery trout stocking in streams and the conservative, selective fishing regulations.

2.1.4) Description of additional fishery impacts not addressed within this FMEP for the listed ESUs specified in section 1.3. Account for harvest impacts in previous year and the impacts expected in the future:

Ocean catch of steelhead by sport fishermen off the Oregon coast is rare (Schindler, 2000). It is not legal to retain steelhead in offshore commercial catches in Alaska, Oregon, California, or Washington. British Columbia does allow an incidental catch of steelhead, but the number caught is small (Caverhill, 2000). Columbia River impacts are described in section 1.2.2 and are estimated to be less than 2% (WDFW and ODFW 2000). Mandatory wild release regulations are in effort for sport steelhead angling in the Columbia River. Hook and release mortality associated with this fishery is expected to remain at or near 5% for winter steelhead as described by Hooton (1987).

SECTION 3. MONITORING AND EVALUATION

3.1) Description of the specific monitoring of the "Performance Indicators" listed in section 1.1.3:

The performance indicators for wild escapement will be measured as counts of naturally produced steelhead past Marmot and North Fork dams and the Bonnie Falls fishway (see descriptions below).

***Marmot Dam fish counts, Sandy River*:** Marmot Dam is owned by Portland General Electric Company. Part of its facilities includes a fishway featuring an upstream migrant trap, and monitoring is conducted as an absolute count of all fish entering the fishway. Hatchery winter steelhead that reach this point are recorded and transported back downstream to be recycled through the fishery, only naturally produced steelhead are allowed to pass upstream to spawn naturally.

***North Fork Dam fish counts, Clackamas River*:** This is a trapping facility that has been built into the fishway for North Fork Dam. This facility provides a 24-hour a day counts and monitoring is conducted as an absolute count of all fish entering the fishway. Hatchery winter steelhead that reach this point are recorded and transported back downstream to be recycled through the fishery, only naturally produced steelhead are allowed to pass upstream to spawn naturally.

***North Fork Scappoose Creek fish counts*:** Scappoose Creek is a tributary of the Scappoose Bay/Columbia River at R.M. 4.7. This facility utilizes a fishway on a natural falls that is being used as an adult trap to monitor adult salmon and steelhead. It is operated through winter and spring months annually as a method of enumerating wild steelhead and coho entering the upper basin daily.

Additional performance indicators are harvest card estimates and downstream migrant traps are described below.

***Harvest Card estimates*:** Oregon anglers are required by law to record their salmon and steelhead catches on the Harvest Card that they purchase. They are also required to return it to the Department annually. They are required to provide the location and numbers of salmon and steelhead that they catch. The Department uses this information to estimate catch rates by river, total catch, total effort, and a population estimate.

Downstream migrant traps in both the upper Sandy and Clackamas basins are generating supplemental fish population information in the manner of catch estimates from smolt traps operated by the US Forest Service and PGE. Information is summarized annually and provided to the Department for further analysis.

Performance indicators also include creel survey programs from the lower Willamette River spring Chinook fishery which provide catch rate, fishing effort, and catch composition (size, age, mark rates, etc.) information.

3.2) Description of other monitoring and evaluation not included in the Performance Indicators (section 3.1) which provides additional information useful for fisheries management:

The District conducts juvenile sampling to assess the presence or absence of fish. The data is used to support Department advice to other State agencies, such as the Oregon Division of State Lands, Department of Minerals and Geology, Parks Department, Agriculture Department and Oregon Water Resources.

If funding is available, the following activities will be implemented to provide additional information for monitoring:

- Annual statistical creel programs on the Clackamas and Sandy Rivers, designed to provide a comprehensive analysis of the fishery utilizing records of angling effort, catch, harvest, hatchery/wild ratio, and the distribution of angler pressure.

- Annual foot, boat, and aerial spawning ground surveys describing the location and abundance of adult spawning.

- Development of a population model allowing a total population prediction based on the Marmot and North Fork dam counts.

3.3) Public Outreach:

Annually, the Department accepts comments on proposed angling regulation changes and/or additions from the public. A well-defined public process is conducted and a series of public meetings held to discuss Department options and public comments. In addition, the Department publishes informational handouts, news releases, action notices and weekly fishing reports.

The Department posts information signs at fishery access points and delivers handouts on hatchery fin-clip combinations to local sporting goods outlets. Districts supply information via phone calls and/or faxes to key constituents and to local fishing news publications. Further, ODFW operates an information line, a tape-recorded hotline, and an Internet web page featuring timely information. Each basin within the ESU has developed a Sub-basin Fish Management Plan. These plans are developed with the assistance of a Public Advisory Committee represented by members of user groups and members of the community at large. These subbasin plans address the management of each basin and are dynamic documents open to review as needed.

In addition to fishery-related outreach efforts, the state of Oregon including the ODFW is conducting a broad-based watershed recovery effort called the Willamette Restoration Initiative (WRI). The WRI is a new effort seeking to promote, integrate, and coordinate efforts to protect and restore the health of the watershed. Designed as a public/private partnership, the Initiative works closely with state and federal agencies, while bringing a new focus to exploring the restoration interests and capabilities of businesses, landowners, non-profit organizations, local governments, and watershed councils in the basin. One of the first tasks of the Initiative has been to help guide the development of the "Willamette chapter" of the Oregon Plan for Salmon and Watersheds.

3.4) Enforcement:

Sport fishing regulations are adopted by the Fish and Wildlife Commission and enforced by the Fish and Wildlife Division of the Oregon State Police (OSP). This agency works in close partnership with the ODFW. The OSP and ODFW work together to develop enforceable regulation so as to achieve fish and wildlife resource management goals. The Fish and Wildlife Enforcement Division currently includes 128 Supervisors and Troopers. 16 Supervisors and Troopers are dedicated to the Lower Columbia and Lower Willamette Rivers.

ODFW and OSP work together to facilitate enforcement of resource management goals through an annual cooperative enforcement planning process. Troopers meet yearly with local biologists to set enforcement priorities by species, developing tactical plans addressing priority issues related to compliance levels sufficient to protect resources and meet management goals. The results of each tactical plan are quantified and compared to the compliance level considered necessary to meet

management goals. Compliance goals are typically estimated based on the percentage of angler contacts with no noted violations, and the tactical plans are adjusted as needed to meet management goals.

Protection of adult wild steelhead are assigned a high priority for compliance enforcement. Smolt protection is also a high priority during their migration from spawning beds to the ocean. Troopers conduct bank and boat patrols to check and assist anglers. ODFW personnel check anglers during creel, carcass, and spawning ground surveys. **Observations by the Oregon State Police (OSP) indicate angler compliance with wild release regulations is high (in excess of 90%).**

3.5) Schedule and process for reviewing and modifying fisheries management:

3.5.1) Description of the process and schedule that will be used annually to evaluate the fisheries, and revise management assumptions and targets if necessary:

To ensure that fish population and fishery management is meeting the goals described in this plan, annual monitoring will include wild fish escapement numbers and/or indices at locations such as Bonnie Falls (Scappoose Creek), Marmot Dam (Sandy River) and North Fork Dam (Clackamas River). Angler creels, if funded for the Clackamas River and Sandy River spring Chinook and summer steelhead fisheries, will provide information on harvest of hatchery fish and handle of wild fish, fishery effort, fishery catch per unit effort, and projected fishery impacts on wild fish. Ongoing creel programs in the lower Willamette River mainstem will also provide this information. Compliance with provisions in this plan will be evaluated each year by the North Willamette Watershed District staff and appropriate ODFW Portland staff. When steelhead angler creel surveys are implemented, harvest rates, angler effort, and regulation compliance will be monitored. This information will be provided to NMFS in Portland, Oregon, by March 31st of each year the FMEP is in effect. If harvest rates exceed predicted levels, then appropriate reductions in bag limits or catch and release regulations will be implemented as deemed necessary.

If average annual impact rates exceed the described in section 1.4.1, additional fishery restrictions will be implemented to reduce impacts to prescribed levels.

3.5.2) Description of the process and schedule that will occur every 5 years to evaluate whether the FMEP is accomplishing the stated objectives. The conditions under which revisions to the FMEP will be made and how the revisions will likely be accomplished should be included:

This FMEP is intended to remain in effect indefinitely. Wild population status and fishery performance will continue to be assessed by the Oregon Department of Fish and Wildlife on and annual basis. Brood year survival for wild winter steelhead in the Lower Columbia River ESU can be assessed every five years, given average lengths of freshwater and ocean residency. This FMEP will be evaluated every five years for effectiveness. Comprehensive reviews will be repeated at that

interval until such time as the ESU is declared recovered and is delisted. Revisions to this plan will be made as performance indicators suggest that the stated objectives are not being met. Revisions will we undertaken in cooperation with appropriate Portland Headquarters and Region staff, NMFS staff, the interested public and our tribal co-managers. The Technical Review Team will be consulted during the periodic review process. Revision of this FMEP may include changes and updates in the Population Viability Analysis and viable and critical thresholds.

SECTION 4. CONSISTENCY OF FMEP WITH PLANS AND CONDITIONS SET WITHIN ANY FEDERAL COURT PROCEEDINGS

Actions and objectives contained in this proposed FMEP related to Lower Columbia River ESU winter steelhead do not directly impact Federal tribal trust resources. Tribal trust resources do not exist for Willamette winter steelhead in the Willamette Basin. There are no existing court orders with continuing jurisdiction over tribal harvest allocations that are relevant to the implementation of the proposed FMEP.

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